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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,653	01/24/2006	Koichi Kanaya	126247	6147
25944 7590 09/18/2008 OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850				
EXAMINER				
CHEN, KEATH T				
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1792				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/565,653

**Applicant(s)**

KANAYA ET AL.

**Examiner**

KEATH CHEN

**Art Unit**

1792

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 July 2008.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 9-12, 15 and 16 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 9-12, 15 and 16 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. The claim amendment filed on 07/23/2008, addressing claim 9-12, 15 and 16 rejections from the first office action (03/25/2008), by amending claim 9, is acknowledged and will be addressed below.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**2. Claims 9, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kokusai (JP 2000355766 a second English Translation as of 03/10/2008, hereafter '766), in view of Murakami (US 5088697, hereafter '697).**

'766 teaches some limitations of claim 9:

A vapor phase growth method (Title and claim 2), comprising performing a vapor phase growth of a silicon ('766 translation, [0005]) epitaxial ([0001] layer on a main surface (Fig. 3, #5, the top of #5 is a main surface) of a silicon single crystal ([0003] and Fig. 1, #16, epitaxial growth has to be on single crystal) substrate using a vapor phase growth apparatus, wherein: the vapor phase growth apparatus (Fig. 3) comprises a susceptor (Fig. 2, #17, the second susceptor) for performing the vapor phase growth of the silicon ('766 translation, [0005]) epitaxial ([0001]) layer on the main surface (Fig. 3, #5, the top of #5 is a main surface) of the silicon crystal substrate (Fig. 1, #16, epitaxial growth has to be on single crystal) while heating the silicon single crystal substrate from both sides (Fig. 3, heating from left and right sides of each wafer #5) while the substrate

is on a pocket (#31) formed on the susceptor (#17); the pocket has an outer peripheral side part (Fig. 2, the outside of #31 which is near the substrate #5) which supports a rear surface of the silicon single crystal substrate and an inner peripheral side part (Fig. 2, the inside of #31) which is kept in a state of being more recessed than the outer peripheral side part in an inside of the outer peripheral side part. (similar to canceled claim 5); and the susceptor is formed by heat-treating a body section (material of #17 is a body) and then coating a surface of the body section with SiC ([0013], line 4, SiC coat carbon), and among the susceptors formed so that an entirety of the longitudinal sectional shape of the susceptor is warped to an inverted U-shape or to an U-shape during the heat-treating, the susceptor which is warped to the inverted U-shape is selected to be used.

The examiner considers the claimed limitations "among the susceptors formed so that an entirety of the longitudinal sectional shape of the susceptor is warped to an inverted U-shape or to an U-shape during the heat-treating, the susceptor which is warped to the inverted U-shape is selected to be used" a product by process claim. When the reference teaches a product that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process claim although produced by a different process. See *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983) and *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). See also MPEP §2113.

'766 teaches an inverted U-shaped formed by Zagury ([0009]), not by heat treatment. This is considered as the product by process claim (MPEP 2113) is limited by

its structure and the susceptor #17 having crevices #31 and #32, similar to applicant's Fig. 2A, therefore does meet the structure limitations of the warped susceptor.

'766 does not explicitly teaches the other limitation of claim 9:

The susceptor is formed by heat-treating a body section composed of graphite.

'697 is an analogous art in the field of CVD (abstract), particularly in eliminating the bad effect on the exposed portion of the susceptor (col. 2, lines 27-31). '697 teaches that graphite is normally used for susceptor because its workability (col. 3, lines 36-38).

At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to have adopted graphite as susceptor material as taught by '697 in the apparatus of Fig. 2 of '766, for the purpose of workability.

'766 further teaches the limitations of claim 11:

The susceptor is a type of a single wafer (Fig. 2, each secondary susceptor #17 holds one wafer #5), and a curvature on a rear surface side of the susceptor is  $1.75 \times 10^{-5} \text{ mm}^{-1}$  or less.

Based on the information in Table 1 of '766, an 8 inch wafer with an 85  $\mu\text{m}$  depth crevice is equivalent to a curvature of  $1.7 \times 10^{-5} \text{ mm}^{-1}$ , therefore, '766 taught the limitations of claim 7.

The above combination would also have met the limitations of claim 15:

A depth of the pocket has been reduced (by the heat treatment equivalent of milling process) by a warp amount during the heat-treatment warping of the inverted U-shaped longitudinal sectional shape.

**3. Claims 10, 12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over '766 and '697, further in view of Yao et al. (US 2002/0066412, hereafter '412).**

'766 and '697, together, teach all limitations of claims 9 and 15, as discussed above. '766 further teaches the distance between a bottom surface of the inner peripheral side part in the pocket and a rear surface of the silicon single crystal substrate (or the gap) for 200 mm wafers. Although '766 indicates the depth of the gap increases as wafer size increases, the gap depth is well below 0.4 mm (Table 1).

'766 and '697, together, do not explicitly teach the limitations of claims 10 and 16:

The pocket is formed for a silicon single crystal substrate having a diameter of 300 mm or more, and when a silicon single crystal substrate is placed on and supported by the outer peripheral side part of the susceptor, a maximum distance between a bottom surface of the inner peripheral side part in the pocket and a rear surface of the silicon single crystal substrate is less than 0.4 mm.

'412 is an analogous art in the field of chemical vapor deposition, specifically for processing a semiconductor substrate that minimizes contact with the backside of the substrate. '412 provides the gap depth at a range of 0.15 to 0.5 mm for 300 mm wafers (bottom of [0029]), preferably at 0.25 mm.

At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to have adopted the range provided by '412 and incorporated a 0.25 mm gap depth to the pocket #31 in Fig. 2 of '766, in a susceptor for 300 mm wafers, with a reasonable expectation of success and the expectation of similar results. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) (MPEP 2144.07).

For substantially the same reason as claim 11 above, claim 12 is rejected.

### ***Response to Arguments***

Applicant's arguments filed 07/23/2008 have been fully considered but they are not persuasive.

4. Applicants' arguments on 35 USC 103(a) rejection based on Kokusai '766 in view of '697 is that there is not teaching in '766 that the susceptor would warp into a U-shape or an inverted U-shape during heat treating, see the bottom paragraph of page 5.

This argument is found not persuasive as this limitation is considered a product-by-process claim. The burden of prove is shift to the Applicant to show unobvious difference, MPEP 2113 which has been addressed in the previous action.

Applicants further argue that '766 does not inherently teach or possess properties achieved by the method of claim 9 using a warped susceptor, see the first complete paragraph of page 6.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., reduced slip dislocation) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In addition, when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

The examiner suggests MPEP 2145 I: "ARGUMENT DOES NOT REPLACE EVIDENCE WHERE EVIDENCE IS NECESSARY" as a way to provide clear evidence on the record to differentiate the susceptor made by warping during heat treatment from the susceptor made by mechanical milling.

### ***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. C./  
Examiner, Art Unit 1792

/Michael Cleveland/  
Supervisory Patent Examiner, Art Unit 1792